Department of Computer Science
CMPT 429.3
Midterm Examination
CLOSED BOOK

Marks | Time: 50 minutes | March 8, 2002

(8) 1. Define precisely the following:
   a) reduced grammar
   b) simple LL(1) grammar
   c) simple phrase
   d) nullable nonterminal

(12) 2. a) What are ways of avoiding the design of a new language?
   b) From a programming language design viewpoint, give a very brief evaluation of a high-level language that you know well.

(10) 3. Construct a deterministic finite automaton which accepts all strings of 0's and 1's having both an odd number of 0's and an odd number of 1's. A state diagram is sufficient!

(10) 4. Obtain a grammar for the language which consists of the set of all strings containing more 0's than 1's.

(10) 5. a) Find the FIRST and FOLLOW sets for the following grammar:

0.	$S' \rightarrow S\#$
1.	$S \rightarrow ABC$
2.,3.,4.	$A \rightarrow a \mid Cb \mid \varepsilon$
5., 6., 7.	$B \rightarrow c \mid dA \mid \varepsilon$
8., 9.	$C \rightarrow e \mid f$

where $V_N = \{A, B, C, S, S'\}$ and $V_T = \{a, b, c, d, e, f\}$

b) Determine whether or not the grammar in Part a) is LL(1). Show your work!